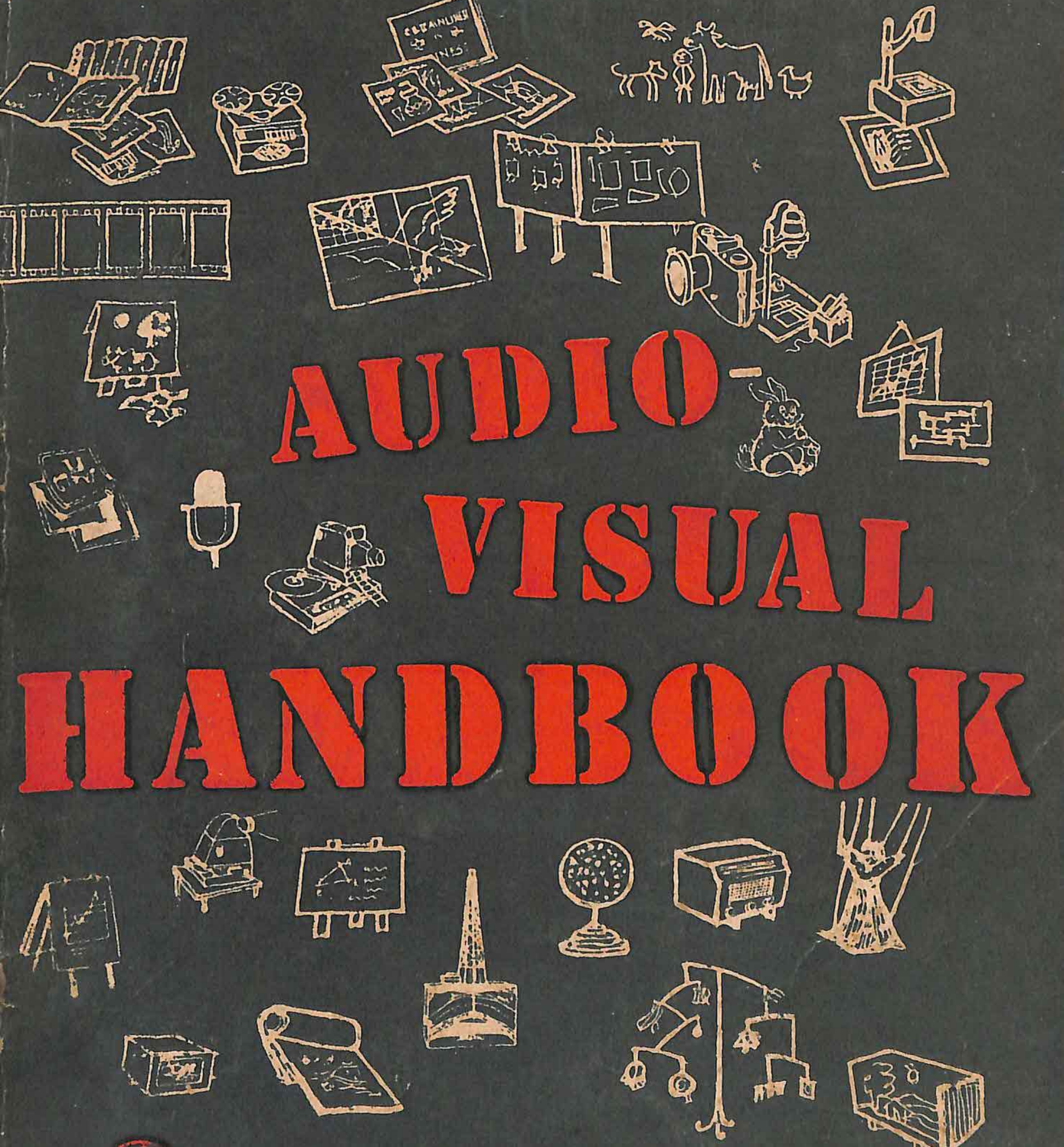
# AUDIO-VISUAL HANDBOOK



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# AUDIO-VISUAL HANDBOOK

S. L. Ahluwalia

STATE INSTITUTE OF EDUCATION
BANIPUR

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# FOREWORD

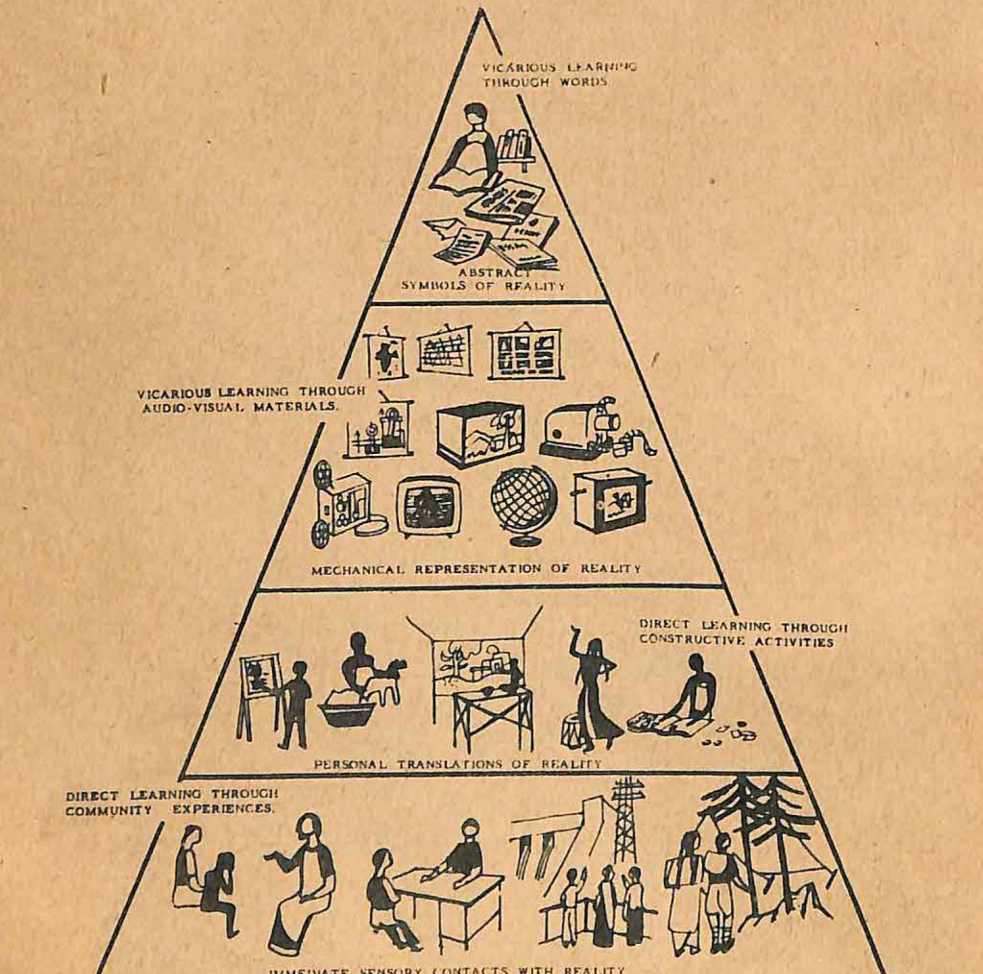
AUDIO-VISUAL materials reinforce the spoken or written words with concrete images and thus provide rich perceptual experiences which are the basis of learning. These materials make learning less non-verbalistic and reduce the boredom of mere verbalism. They offer a variety of experiences which stimulate self-activity on the part of the pupils. Such experiences are not being easily secured in other materials. They contribute to the depth and variety of learning and thus make learning more permanent. Due to the additional experiences and techniques offered by these materials or teaching aids, a broader curriculum is established, and increased meaning is brought to current experiences. The teacher in order to utilize this broad curriculum needs a knowledge of unique contributions of different types of materials, of fundamental principles and techniques of utilization and of reliable methods of evaluation.

Audio-visual materials supplement the teacher, they do not supplant him. The aids alone cannot accomplish the task of education. The teacher always remains the main pivot of all teaching. Visual aids when properly utilized reinforce learning. In the use of audio-visual aids, the teacher should be clear about his teaching objectives and thus make the right use of the right material, at the right place, and at the right time.

The Directorate of Extension Programmes for Secondary Education have a scheme of centralized publications whereby literature pertaining to different techniques of teaching and other vital aspects of the curriculum is prepared and distributed. The author of this brochure, Shri S.L. Ahluwalia, Director, Department of Audio-Visual Education has a vast and varied background of experience in the field of audio-visual education. He has attempted to cover different aspects of audio visual instruction. I am hopeful that this brochure will serve as a useful handbook for all teachers in secondary schools and will equip them with some of the basic techniques of preparing simple and inexpensive teaching materials.

A. C. DEVE GOWDA

# *History of Audio-Visual Education*


VICARIOUS LEARNING THROUGH WORDS
ABSTRACT SYMBOLS OF REALITY
VICARIOUS LEARNING THROUGH AUDIO-VISUAL MATERIALS.
MECHANICAL REPRESENTATION OF REALITY
DIRECT LEARNING THROUGH CONSTRUCTIVE ACTIVITIES
PERSONAL TRANSLATIONS OF REALITY
DIRECT LEARNING THROUGH COMMUNITY EXPERIENCES.
IMMEDIATE SENSORY CONTACTS WITH REALITY
ACTUAL LIVING EXPERIENCES WITH THE FAMILY AND IN SOCIETY

SYMBOLIC REPRESENTATION OF
LEARNING THROUGH AUDIO VISUAL
MATERIALS

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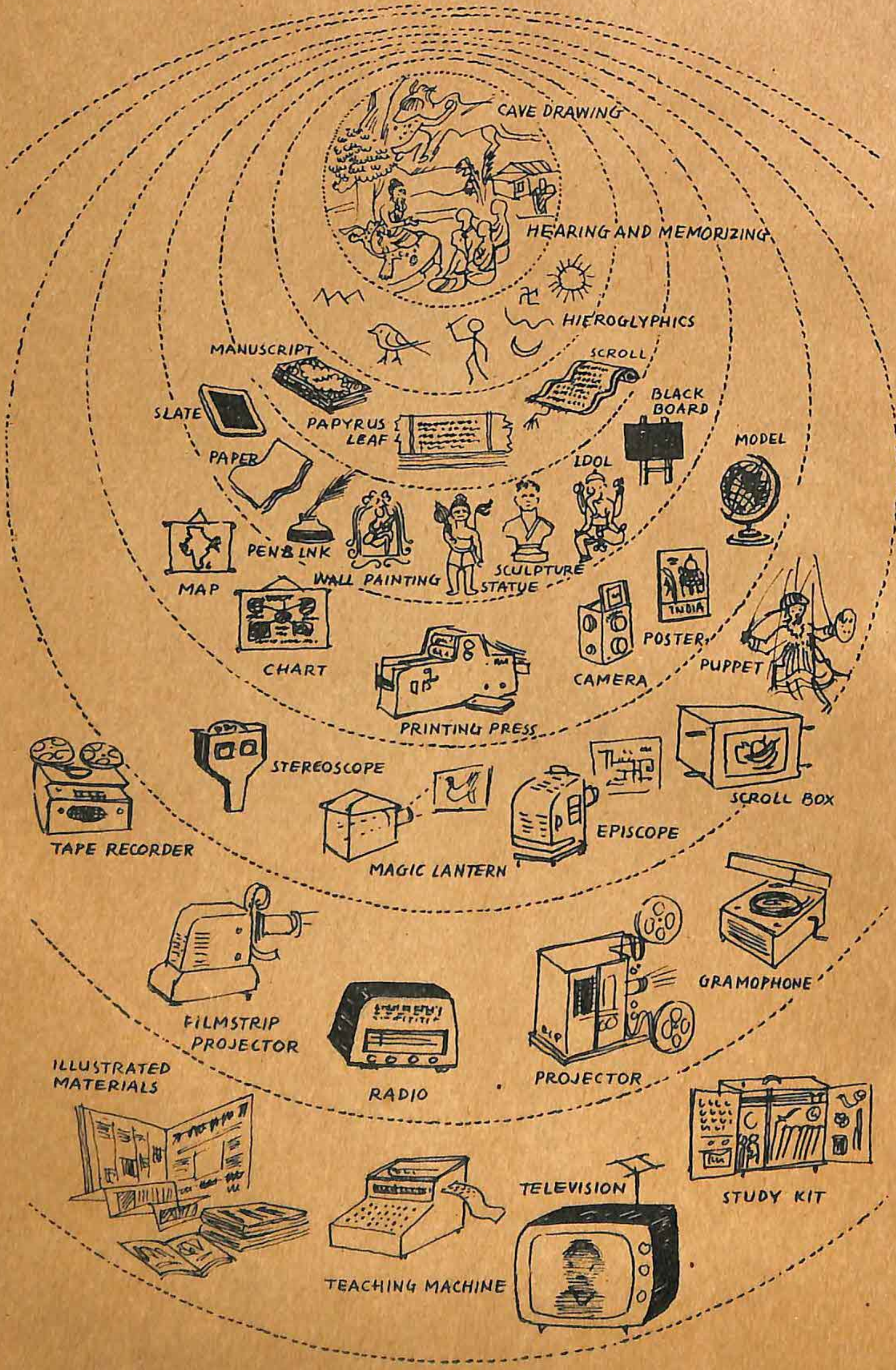
CAVE DRAWING
HEARING AND MEMORIZING
HIEROGLYPHICS
MANUSCRIPT
SCROLL
SLATE
PAPYRUS LEAF
BLACK BOARD
MODEL
PAPER
IDOL
MAP
PEN & INK
WALL PAINTING
SCULPTURE
STATUE
INDIA
CHART
POSTER
CAMERA
PUPPET
PRINTING PRESS
STEREOSCOPE
SCROLL BOX
TAPE RECORDER
EPISCOPE
MAGIC LANTERN
GRAMOPHONE
FILMSTRIP PROJECTOR
RADIO
PROJECTOR
ILLUSTRATED MATERIALS
TELEVISION
STUDY KIT
TEACHING MACHINE

# Introduction

1

IN RECONSTRUCTING the fabric of education in India, audio-visual materials and media have a very vital role to play. Audio-visual materials and techniques provide the fundamental means of organizing and revitalizing the curriculum. In developing countries, such as ours, in the coming decade, it may not be possible to equip all pupils with materials of individualized instruction, such as textbooks, supplementary reading materials, programmed texts, teaching machines, etc. The accent has to be on materials for group work and classroom teaching inexpensive teacher-made materials or mass-produced audio-visual aids. Audio-visual materials are not an end in themselves. They are the means to an end. Basically all such materials are audio-visual-verbal, where verbalism becomes heavy, effective and properly designed audio-visual materials provide a relief. The aim of all materials and media is to facilitate an easy perceptual assimilation of the content of instruction and ultimately educate the child. The learning stimuli that impinge upon our perception are mainly audio-visual. They form a concrete base for learning and develop purposeful experiences. Hence learning becomes permanent. These materials economize time and effort and create an impact. The educators must progressively become conscious of these and integrate these in teaching learning situation.

An attempt has been made to highlight various varieties of audio-visual material that a teacher can use to make the teaching more effective. Basic techniques of preparing some of the inexpensive good visual-aids have been outlined. It is hoped that this hand-book will serve as a simple resource guide to reorientate the teachers towards better methods of teaching.

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## 2

# Audio-Visual Aids

AUDIO-VISUAL education involves the use of instructional devices, such as, motion pictures, filmstrips, television, recordings, graphic illustrations like charts and maps, models, field trips, demonstrations, etc.

Such devices popularly known as audio-visual aids, transmit ideas and experiences through eyes and ears. They emphasize the use of concrete or non-verbal experience in the learning process. Other forms of instruction stress verbal or symbolic experience.

The basic element of the visual aids is their pictorial content. They present the subject-matter mainly through the medium of pictures and sketches. Thus they facilitate the formation of mental images so basic to learning.

### Effective Use of A. V. Aids

Adds interest and involvement
Makes learning permanent
Reduces verbalism
Develops greater understanding
Removes the barriers of classroom walls
Stimulates self-activity
Fosters continuity of thought
Makes us teach efficiently
Helps us in overcoming language barriers
Takes the message to many people
Provides a great variety of methods
Brings the world into the classroom

### Classification of A. V. Aids

(*a*) *Graphic Aids*

1 Photographs and Pictures
2 Flash Cards and Strips
3 Posters
4 Charts
5 Diagrams
6 Graphs
7 Maps
8 Cartoons
9 Comics

(*b*) *Display Boards*

1 Black Board
2 Flannel Board
3 Bulletin Board
4 Magnent Board
5 Peg Board

(*c*) *Three-dimensional Aids*

1 Models
2 Objects
3 Specimens
4 Mock-ups
5 Dioramas
6 Puppets
7 Mobiles

(*d*) *Projected Aids*

1 Films
2 Filmstrips
3 Slides

(*e*) *Audio Aids*

1 Radio
2 Television
3 Recordings

(*f*) *Activity Aids*

1 Field Trips
2 Demonstrations
3 Dramatics

# Audio-Visual Communication

## 3

COMMUNICATION is derived from the latin word *communis* meaning common. In the process of communicating an information or a state of mind, a commonness is established between two or more persons. Communication is a two-way sharing process that makes an idea common to two or more persons. The frame of reference of communication is all-embracing. This involves, not only written and oral words by which one mind may affect another, but also all other materials and procedures by which one mind may affect another. The range of communication is from face-to-face to mass.

### The Content of Communication

The communication situation has certain basic elements. It is a dynamic organization of the communicator or sender, interpreter or receiver and communication content or message. The sender may be an individual or an organization. The receiver may be an individual or a member of a group. The content of communication is an organized field of stimuli consisting of a variety of signs and symbols produced by a communicating agency and perceived through single or multi-sensory channels. When the sender wants to build up a commonness with the receiver, he encodes his message or he puts the information or feeling to be shared in a form that conveys the meaning.

### Audio-Visual Materials

In the entire process of communication, the contribution of audio-visual aids or materials stands out prominently. They constitute the only and exclusive media or channels of communication. We term them popularly as audio-visual, since about 85 to 90 per cent of the signals or sense-stimuli enter our perception through the eyes and the ears. A broad background of perceptual experiences is the basis for learning and communication. Our perceptor sensory mechanisms—the eyes, the ears, the nerve endings which respond to pressure, to heat and cold, and to odours and tastes—are constantly in contact with environments. Since all the senses provide stimuli for our perceptual reorganization and integration, so sometimes these materials which make us learn are termed as multi-sensory materials.

The audio-visual method of learning is as old as humanity itself, but in the professional literature there are many technical terms of recent origin which are intimately and closely allied to audio-visual materials—'visual education', 'visual instruction', 'visual aids', 'audio-visual instruction', 'audio-visual aids', 'audio-visual training aids', 'multi-sensory aids', 'visual-sensory aids', etc.

Edgar Dale presents an absolutely new approach when he remarks : 'Although we commonly use the term audio-visual, it is merely a short way of describing materials of instruction which are less abstract than words themselves. Even here we must exercise care because it would be more accurate to call them audio-visual-verbal materials because these relatively more concrete experiences are nearly always skilfully integrated with words themselves.'

### Audio-Visual Communication

Audio-visual communication is that phenomenon or process whereby identical messages are conveyed to different persons through the agency of audio-visual materials or mass media as instruments of communication. Analyzing the fundamental processes involved in learning and communication, we find that we can trace many identical and overlapping concepts in the theoretical analysis of both the terms. Learning, communication, education instruction, teaching, are often loosely used as synonymous terms.

Since audio-visual experiences of many kinds crowd the working hours of school children, the modern educator is becoming more and more conscious of the efficacy of audio-visual instruction.

## 4

# Audio-Visual Materials and the Thinking Process

THINKING involves an integration of awareness, building of concepts, an insight into problems, imagination and reasoning.

Thinking is a psychological activity motivated through the perception of environment. It is the stream of consciousness which is externally depicted in overt activities.

Thinking is an integration of awareness which results in the building of concepts, insight into problems, imagination and reasoning. Insight is the sudden grasp or understanding of a problem stirred by a comprehensive whole of a past experience. Imagination is basically exploring mentally with the help of perceptual images in various possible directions and ramifications, and reasoning is crystallizing and pinpointing certain elements of the consciousness.

All these mental activities involve grouping, regrouping, organizing and reorganizing of the data of consciousness. This basically hinges around the building of concepts.

### Concepts

Thinking is synonymous with an organization of perception resulting ultimately in the evolution of concepts. Proper thinking leads to proper concepts.

Concept building is an on-going process that operates from the time a child begins to distil certain conclusions from his experiences and applies these to new situations. It involves making of suitable classifications and generalizations. The richer the experience, the more solid will be the generalization.

Audio-visual materials or aids provide a richer basis for learning. They send out many sense-stimuli to be perceived and imbibed by the mind. They facilitate the process of integration of awareness or perception. Of course, as outlined by the analytical psychologists, there are a variety of internal stimuli provided by the various functional forces of the mind : the reservoir of the unconscious mind, the consciousness, the ego and the super-ego. All these internal and external stimulants keep the stream of consciousness flowing. By a process of selection, discrimination, integration and generalization, the ever-expanding spiral of concepts is strengthened.

### Conclusion

Thinking is a continuous flow of the stream of awareness. It may be at its lowest ebb in sleep. It is never retarded. The more the number of external and internal stimuli, the greater will be the motivation for the development of concepts and quicker will be the process of thinking. Direct, purposeful, multi-sensory or audio-visual experiences land the mind in a volatile, dynamic and wholistic field of stimuli, and hence thinking is enriched. Audio-visual aids help us learn about 35 per cent quicker and retain 55 per cent longer. Could this be done with the retarded thinking process?

# Advantages and Limitations of Visual Aids

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THE USE of visual aids depends upon the imagination of the teacher. Inherent in these, there are certain advantages as well as disadvantages, which are enumerated below :

A competent teacher can harness a particular aid to his advantage using it properly for creating the maximum impact.

### Chalk Board (Black Board)

*Advantages*

1. Inexpensive
2. Easily used for a wide range of graphic representations
3. Material may be erased and board used again

*Limitations*

1. Two dimensional only
2. Cannot show motion
3. Limited audience
4. For best results, needs trained users
5. Chalk dust

### Flannel Graph or Flannel Board

*Advantages*

1. Most of advantages of black board
2. No chalk dust
3. Materials once prepared can be used again and again
4. Changing relationships can be shown quickly
5. Material readily available
6. Production of materials can be undertaken by individual users

*Limitations*

1. Limited audience
2. Cannot be used in wind
3. Does not show motion

### Graphics, Pictures, Posters, Photographs, Diagrams, Graphs and Maps

*Advantages*

1. Can be duplicated easily
2. Can be stored and classified easily

3 Easily transportable
4 Can reach a large public

*Limitations*

1 Does not show motion

**Models**

*Advantages*

1 The possibility of having enlarged or reduced scale models helps close examination
2 Give notion of reality
3 Can show construction, function and working as if in reality
4 Three dimensional

*Limitations*

1 Not easily obtainable, does not apply to models made locally of simple materials, *e.g.,* clay
3 Often fragile
4 Sometimes not easily portable
4 May give wrong conception of size
5 Limited audience

**Objects and Specimens**

*Advantages*

1 Real and not subsitutes
2 Give direct experience
3 Three dimensional

*Limitations*

1 May not be easily obtainable
2 May be inconvenient in size or dangerous
3 Sometimes costly
4 Can be used conveniently only in small groups
5 Some objects too fragile to touch
6 Storage problems

**Motion Pictures**

*Advantages*

1 Close to reality, giving movement and sound
2 Large audiences possible
3 Multiple distribution
4 Compression of time and space
5 Moulds attitudes, arouses the emotion, poses and deals with problems easily

*Limitations*

1 Comparatively high unit cost
2 Projection conditions restricted
3 Trained staff required
4 Electricity required
5 Equipment not easily transportable
6 Difficult to discuss points during projection

**Filmstrips and Slides**

*Advantages*

1 Correlation of information
2 Comparison and deduction made easy
3 Film slide can change order
4 Film slide can be protected from surface damage by glass
5 Multiple reproduction and distribution
6 Sometimes kerosene can be used a illuminant

*Limitations*

1 Order of presentation remains constant with filmstrips
2 Slides can get out of sequence
3 Slides are breakable
4 Cannot show motion
5 Needs artificial illuminant
6 Needs darkness for best projection results
7 Electricity generally required

**Drama**

*Advantages*

1 Selective
2 Close to reality
3 Effective emotional indentification

*Limitations*

1 Restricted in time and space
2 Maximum effect depends upon good acting, production, etc. Each performance is unique

3 Cannot be multiplied
4 Restricted audience

**Field Trips**

*Advantages*

1 Observation and participation in reality

*Limitations*

1 Time consuming
2 Limited geographical area or activity

**Opaque Projection**

*Advantages*

1 Convenient for enlarging material
2 Can be used for transferring illustrative material to chalk board or paper for ease of copying
3 Easy to use a pointer with the projected material

*Limitations*

1 Cannot show transparent material
2 Best use in darkness
3 Size of audience more limited than diascope due to poor illuminant
4 Electricity required
5 Bulky and rather fragile machine

# Graphic Materials

## 6

GRAPHICS are a powerful medium for teaching and learning. In some from or other they are represented in most of the instructional materials. Instructional materials are devices as motion pictures, filmstrips, televisions, recordings, graphic illustrations like charts and maps, models, field-trips, demonstration, etc. These devices, popularly known as audio-visual aids, transmit ideas and experiences through eyes and ears. They emphasize the use of concrete or non-verbal experience in the learning process. Other forms of instruction stress verbal or symbolic-experience.

A broad background of perceptual experiences is the basis for learning. Our senses provide stimuli for our perceptual reorganization. So, sometimes, these materials of instruction, that are less abstract than words are termed as multi-sensory materials. The term, audio-visual aids, is a short way of describing these materials.

The basic element of the visual aids is their pictorial content. They present subject matter mainly through the medium of pictures and sketches. Thus they facilitate the formation of mental images so basic to learning. Graphic materials possess all these characteristics. These are effective instructional materials.

**Nature of Graphic Materials**

Graphics are instructional materials that visualize and simplify ideas and facts. They convey meaning mainly through relatively conventionalized symbols that are nearer to reality perceptually than verbal symbols and relatively farther from reality perceptually than pictures. Graphics catch and hold our attention through symbolic representations to clarify ideas and to highlight main points of a topic. They represent the subject matter in a condensed and understandable form. Graphics, in the professional language, indicate materials which illustrate ideas, objects, concepts and processes boldly, clearly and vigorously through a synthesis of drawings, pictures and words.

Graphics develop a forceful shorthand language. Their basic function are to attract attention, convey meaning clearly and to facilitate learning. They create an impact on the readers. They have universal appeal and their educational values are manifold.

Graphic materials are usually two-dimensional representations only. Many of these can be projected through an opaque projector or from films, filmstrips, and slides. They can take the form of dynamic illlustration on flannel boards, chalk boards and other display boards.

Making graphics should form an integral part of teacher's preparation for teaching. It is easy to develop the skill in creating one's own graphics to teach. This helps in organizing knowledge and increasing communication skills.

**Categories of Graphic Aids**

Almost any material involving illustrations is basically graphic in nature. Any representation that portrays ideas boldly, clearly and effectively, by eliminating non-essentials, is a graphic aid for our perception. Hence it is difficult to define a rigid list of these materials. There can be almost infinite variety of graphic materials, however, through common usage. Underneath are the principal categories of graphic aids :

(i) *Charts*

A chart is a systematic arrangement of key facts or ideas in a graphic or pictorial form. It is a representation that depicts logical visualization of relationships by summarizing, comparing or contrasting in explaining subject matter. Common usage has given charts a wider meaning. They include a variety of graphic forms.

(ii) *Posters*

A poster is a pictorial device that is generally symbolic in nature. It is a bold design, with colour and message that attracts attention and communicates just one fact, idea or image rapidly and clearly. A poster is a basic graphic interpretation of the greatest possible impact. Because of its dramatic and impressive presentation, it captivates the eyes regardless of the message or pictorial contents.

(iii) *Diagrams*

A diagram is an explanatory drawing that explains inter-relationships by using lines, geometrical forms and symbols. Sometimes, it is a very complex and abstract representation because the pictorial elements are absent and a variety of symbols are used. Diagrams as visual summaries of facts that are more condensed than in the form of charts.

(iv) *Graphs*

A graph is a representation of quantitative data that present information quickly and effectively. It shows comparisons and relationships of masses of statistical data, clearly and interestingly. Graphs are of many types but basically these have three forms : bar. line, and circle.

(v) *Cartoons*

A cartoon is a metaphorical presentation in the form of a picture or a sketch. It vigorously presents and dramatizes humour, satire, caricature of exaggeration about an idea, a person or a situation. Like the poster, it makes an appeal and conveys a single idea.

(vi) *Comics*

A comic strip is a form of cartooning, depicting story in a sequence. In order to catch the reader's eye they present stories in action. Comics are a potential medium of visual education.

(vii) *Maps*

A map is an accurate representation in the form of a diagram of the surface of the earth or of some part of it, drawn to scale. Maps vary in type and form. They are a convenient and universal educational device that gives various physical, economic and social details.

(viii) *Illustrations*

An illustration is either a painting, a photograph, an etching, a drawing, an engraving or a graphic reproduction of these, which tells a more or less complete story by itself.

# Charts

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CHARTS are an important media of teaching. They serve the following important purposes :

1 To show relationship by means of facts, figures or statistics.

2 To present materials symbolically.

3 To summarize information.

4 To show continuity in process.

5 To present abstract ideas in visual form.

6 To show the development of structures.

7 To create problems and to stimulate thinking.

8 To encourage utilization of other media of communication.

9 To motivate a student's desire to continue related research.

### Reference Files

For preparing a variety of visual aids, it is necessary to develop some reference files for layouts and sketches of your graphic aids. These are also called tear-sheet files. These files serve as a basic resource for hand-made graphic aids. Materials for these files can be assembled from :

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(i) Pictorial, diagrammatic and allied graphic contents and cuttings from newspapers, magazines, comics and other discarded booklets. Some of the common pictorial magazines for this purpose are *Life, Illustrated Weekly, Dharam Yug*, *Readers' Digest*, etc.

(ii) Pamphlets and pictorial display materials from Embassies, Tourist Information Centres, etc.

(iii) Advertisement materials from industrial concerns and other private agencies.

(iv) Sets of picture post-cards and pictorial cut-outs produced commercially.

(v) Tracings of sketches and pictures from encyclopaedias, costly pictorial books, etc.

Arrange these tear-sheets under different sub-heads according to the different categories of pictures or illustrations.

This collection of pictorial materials can be used in a variety of ways. These can be even mounted for bulletin boards and flannel boards.

These will serve as a rich mine for ideas to develop graphic aids.

**Planning and Preparing Charts**

1 Concept or theme to be developed in the charts : Clearly analyze the main theme in various relationships which are to be depicted in the chart.

2 Visualization and illustration of ideas : Make different rough sketches. Draw upon the file and collections as listed above. You can compose and enlarge different illustrations and pictures. Try different layout patterns to get the most effective one.

3 Transfer your ideas from your sketched plan to your chart. Try different layout patterns to get the most effective design. If colours are used, a pencilled sketch on the chart paper will be helpful in order to have guide lines with which to work.

4 Lettering the Charts : Dynamism in lettering makes the charts more effective. Lettering adds meaning, appeal, direction, emphasis and organization to the chart. Keep the following points in view : style, colour, size, difference between similar letters, spacing between letters, width of stroke and colour contrast.

## 8

## Posters

A POSTER is a pictorial device designed to attract attention and communicate a story, a fact, an idea, or an image rapidly and clearly.

Posters either advertize and sell an idea or convey a message to educate. Their role in both formal and informal education is paramount. Posters are a simple graphic interpretation of the greatest possible impact. As an advertizing medium, they arrest the eyes and the minds; they remind the public audience of a message. A poster, because of its dramatic and impressive presentation, captivates the eye regardless of the message or pictorial content. In addition to enlisting attention, it satisfies the viewer emotionally and aesthetically. His eyes will return to it involuntarily.

**Purposes of Posters**

To present a single idea or a subject forcefully.

To motivate or stimulate school and class interest.

To publicize important school and community events and projects.

To further the acceptance of favourable habits and attitudes by motivating action.

To add atmosphere to the classroom.

To compel attention by some attractive feature and thus convey the message attractively and quickly.

### Basic Features of Posters

| | |
|---|---|
| *Brevity :* | Use the minimum of words to convey the main idea. There should not be more than 8 words, but 4 or 5 are better. |
| *Simplicity :* | Sub-divide the poster into minimum of individual units that create a compactness. Use bold illustrations with essential details. Avoid fancy lettering styles. |
| *Idea :* | This is the most important feature. The more original and clever is the idea, the bigger is the popular appeal. |
| *Layout :* | This refers to the arrangement of the elements of the poster. |
| *Colour :* | Proper use of colour makes the poster more effective. |

### Tips on Preparing Posters

1. Decide your theme.
2. Decide words that are most suitable to provide a slogan or a title.
3. Sketch some layouts and decide on the best.
4. Gather all needed materials to prepare the poster.
5. Prepare the lettering.
6. Add desired objects.
7. Give the finishing touches and erase the smudge marks.

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# Simple Sketching Techniques

## 9

ALL HAND-MADE graphic aids require some understanding of simple sketching techniques. It is not necessary for a teacher to be an artist for developing these aids. Any teacher can draw simple sketches with the help of some simple techniques, analyzed here.

### Sketching with Grid or Graph Lines

A picture or a sketch can be reproduced in a smaller or larger size by drawing grid or graph lines or squares on the sketch. Make a comparative grid of the size into which the final drawing can be fitted. Follow the block and lines from the original sketch to the final one and copy square by square. For greater accuracy sub-divide the squares near the outlines of the sketch in both the grids. Thus pictures and sketches can be reproduced fairly accurately to any size.

### Sketching with the help of Pantograph

A pantograph is a convenient device for enlarging or reducing a sketch. This instrument can be fixed to a table or drawing board at one of its extremities, set aside for this purpose. As one moves the pointer, located at a middle corner, over the outlines of the original drawing, the pencil located at another extremity reproduces the original sketch. The pantograph can be adjusted either to enlarge or to reduce the original to different proportions.

### Enlarging with the help of Opaque Projector

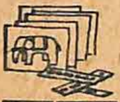
An epidiascope or an opaque projector is probably the most useful equipment for preparing graphic aids. By projecting the original design to a paper fixed to vertical board, we can conveniently enlarge it in a dark room.

### Enlarging with a Transparent Glass

Prepare a wooden stand with a frame that can hold a piece of transparent glass. Prepare another wooden stand of approximately half the height as compared to the glass stand. Fix a small wooden piece with a pin-hole, for viewing at the top. Place the objects or persons in a setting to be sketched in front of the glass opposite to the viewing piece. Draw on the glass with the help of a glass pencil or even an ordinary speed ball pen. This drawing apparatus is useful in providing proper perspective to your sketches.

### Technique of Picture Manipulation

Pictorial elements or details from two or more pictures or sketches can be rearranged to develop or assemble a new picture or sketch. With this technique one can eliminate the unwanted details from one sketch and can add the desired elements from another sketch to create a new one. This technique is commonly adopted by the artists to develop news sketches.



## 10

## Flash Cards

FLASH CARDS are small compact cards that are flashed before class to bring home an idea. Communication of new idea requires repetitive study methods, drill work and review of the discussion or lecture. Flash cards supply an easy and simple medium for the same. Flash cards usually involve photographs and other types of still pictures, and are the simplest of all aids.

Flash cards, like flannel graphs are of maximum use for teaching in kindergarten and elementary schools. These can be used for enriching all areas of the curriculum. If prepared on thick card paper, these can be handled by children themselves. Thus we can introduce the plywood technique through the use of these cards.

### Purpose

To provide pupils with a systematic approach to drill.

To provide small groups or individuals with repetitive study methods.

To teach recognition by sight.

### Proper Use of Cards

Use flash cards with pupils who need drill.

Have pupils make their own sets of flash cards.

Have pupils work together when using flash cards.

Use flash cards for varied indentification purposes.

Do not use flash cards for prolonged periods of time.

### Planning of Flash Cards

1 Choose a theme related to the area of your interest.

2 Analyze it into a series of correlated steps or stages in order to build a story, an idea or a situation.

3 The main point of attraction in a flash card is a picture, a sketch or a diagram. Assemble a series of pictures of diagrams that will indentify various steps.

4 Paste them on uniform cards of a convenient size and insert the relevant text on each.

# Flannel Boards

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A FLANNEL board is a flannel-covered flat surface. Flannel is stretched and then glued to a piece of plywood, masonite board or heavy cardboard. A flannel-graph, also called 'Khadi-graph' consists of a number of separate illustrations, prepared on cardboard, with sand paper strips glued on the backs. When these separate pieces of the flannel-graph are placed on the flannel or khadi, they stick to it.

### Purpose

To save time during class presentation.

To encourage visual presentation of ideas, concepts and colour.

To show movements and arrangements.

To provide tactual and manipulative experience.

To show cumulative processes.

### Proper Use of Flannel Boards

1 Incorporate the use of the flannel board where it is unique, *e. g* ; reading readiness, number, concepts, geometric figures, demonstration of athletic team formations, etc.

2 Make your own flannel board and material.

3 Use good colour contrast of figures, etc., on a neutral background.

4 Do not crowd too much material on the board.

5 Use available materials for making figures, letters, numbers, etc.

6 Avoid the use of the flannel board in place of the chalk board and bulletin board unless it offers more than the other media.

### Developing Flannel Graphic Kits

The main contents of such a kit are the topical packages of envelopes containing cutouts, sequence diagrams, numbered photographs, etc. These should help to compose an idea, develop a message or build an information. A teacher can very easily develop a particular theme or concept into different stages. These stages can be depicted in the form of a flannel graph. Gradually a library of flannel graph can be developed.

## 12

# Chalk Boards

CHALK BOARD is a basic, most widely used and versatile tool of instruction. Even in the modern age of television and teaching machines it remains as the most trusted and powerful companion of a teacher. Next to a teacher's personal visualization of the teaching matter is his verbal delivery of the same. This it always to be supported by a frame-work of visualized details to be displayed on the chalk board. In a rapidly developing society, its ideas and skill have to be made clear to the students. Along with other teaching tools, the wide surface of a chalk board serves as an effective and essential in classroom teaching. A teacher need not be an artist to use the board effectively. The basic techniques can be learnt, practised and developed.

**Techniques of Usage**

Keeping in view the varieties of chalk boards which are of considerable use under different working conditions, a vast variety of techniques of using the chalk-board effectively can be employed. These techniques can be used on most of the available chalk boards. The teacher, by his careful selection, integration and use of the textual details of a subject matter can employ any one or combination of the following techniques in teaching :

*The Template Technique*

When symbols, diagrams and designs are to be repeatedly used for science lessons, it is easier to develop these through templates. Templates are cut out of cardboard, wood or masonite, along the outline of the design drawn on any one of these materials. The template is held against the board and the outline is drawn with chalk. These can be stored conveniently or hung for a ready use.

*The Pattern Technique*

Detailed outlines of diagrams which serve as a basic reference material are punched on heavy tracing paper sheet. The punches are perforated with any sharp-edged pointed material like a nail. The pattern paper is held against the board and a dusty eraser is rubbed against the perforated section of the outline. This will make an outline of chalk dots stick to the board. By free-hand drawings along these dots the basic pattern can be completed.

*The Subject Matter Outline Technique*

Description, procedures, processes and experiments can be detailed out step bv step through properly worded summaries. Technical terms and definitions, propositions and principles, can be memorized and understood by focussing attention on important words and phrases. Key ideas can be conveyed through contrast by the use of heavy and light chalk lines or through the use of coloured chalk.

*The Grid Technique*

Sometimes detailed diagrams, outlines of mechanical gadgets, maps in social studies, etc. are to be enlarged from the textbooks on the board faithfully in correct proportions. This can be done by the drawing small squares on a tracing paper kept on the original diagrams and by transferring the details according to the desired size.

*The Projection Technique*

The same purpose as in above can be served by projecting details from opaque projector or from a filmstrip through a filmstrip projector.

*The Hidden Drawing Technique*

When a process or the development of a concept is to be depicted in sequential steps, the attention can be focussed on the diagrams which are progressively uncovered by a cloth curtain fixed at the top of the board. This method provides a dramatic element in teaching science.

*The Magnetic Board Technique*

This requires the use of steel chalk board and small pieces of magnet. Magnet help to fix symbols or light three-dimensional objects on the board.

*The Supreme Board Technique*

Apart from the visible surface or the board one or more hidden surfaces are available in certain types of boards explained in this article. When contrasting and comparative details of scientific topics are to be explained, some of these can be kept on a surface that is kept hidden. These details are suddenly and dramatically exposed at a psychological moment in teaching. Sometimes the relevant object or model can be kept hidden and is shown at a crucial moment.

# Chalk Sheets for Teaching

## 13

THESE are uniform pieces of sheets of paper painted black and joined together at one end with two thin wooden strips. The sheets can be made of wrapping paper or craft paper of good quality, pastel paper, thin card or construction paper, etc.

**Preparation**

Take even pieces of wrapping paper of good quality. Generally a size approximately 22″ by 28″, is quite convenient for multi-purpose uses. About six to ten even sheets are required.

Select a fine variety of blackboard paint or some black flat varnish paint. Paint the smooth sides of these sheets evenly with a one or two inch wide brush. You can smear the paint even with a piece of cloth. After one coating of such paint, let the sheets be dried in shade. Then give a second coating of paint evenly.

After these sheets get dried, these are to be bound at one end with two thin pieces of wooden strips. The longer edges of the sheets can be kept horizontal or vertical for binding depending upon the way we want to use these. Generally it will be more useful to keep this edge horizontal.

**Method of Using**

These sheets provide a very useful and handy tool for teaching. My personal experiences in different A.V. workshops proves it amply. You can always preplan your lesson for presentation on these sheet. You can develop blackboard details, lesson summaries, and simple explanatory sketches on these sheets. Your ideas or concepts can be easily analyzed into different stages, each being depicted on one sheet. These sheets prove to be very useful in teaching those curricular topics that basically need sequential treatment. Many layers of these sheets make provision for this.

Compose the text and sketches or these sheets with coloured chalk or caryons. These details can be easily wiped clean with a piece of wet cloth. If preserved carefully, these will last you for a good number of times. These can be easily wrapped and conveniently stored.

You can put sheets to various uses in teaching. These can be used by students even individually or in groups, for planning presentations in different subjects. If used along with normal black board work, these sheets enrich the presentation.

## 14

# Bulletin Boards

BULLETIN boards provide the cheapest and multi-purpose nucleus for visual education. The bulletin board, as the name implies, is a place for bulletins, news items, announcements, multifarious items and visual displays that are of absorbing interest to the students.

**Purpose**

1 To motive and to arouse curiosity in the pupils.
2 To display graphic and pictorial materials, possibly linked up with the curriculum, attractively and invitingly.
3 To introduce or summarize a unit of work, or to analyze a topic graphically.
4 To display work done by pupils.
5 To display source materials on individual or group projects.
6 To provide basic means of general communication.

**Uses**

(a) *Decide on a purpose : Your display may be :*

1 Motivational—poses problems, asks questions, excites curiosity ;
2 Developmental—Keeps track of what students are doing ;
3 Cumulative—Graphic summation of a completed study ;
4 Miscellaneous—Such as illustration of holidays, news events, students' work, etc.

(b) *Choose and Illustrate the Headline*

1 It should be large, easy to read from any spot in the room, fairly brief, horizontal, colourful and contrasting.
2 Use either script or block letters. The former can be made of string, wire, etc ; the latter, of cut-paper, card board, wood, etc.

(c) *Arrange and Illustrate the Contents*

1 Use illustrative materials that are eye-catching, such as photographs, drawings, charts, maps, graph posters, 3-D objects, etc.
2 Match the arrangement and materials against the background. 'Shocking or intense backgrounds are hard to live with ; colour must

not dazzle or dance if it is to serve as background for acting and thinking. *Dale.*

3 Compose the materials artistically, keeping in view the basic essentials of balance and continuity.

4 Use arrows, colours, interesting shapes to draw attention to special areas.

5 Highlight the main theme by a catchy device. It may be an illustration, caption or text, or it may be the brightest or the largest item on the board.

(d) *Use Colour*

1 Colours have functional aspects which heighten the reconstruction of reality and provide strong emotional and psychological effects.

2 A jumble of colourful splashes are bad. They divide rather than unite. About three colours not counting the background are suggested.

3 Create an accent with pure colours and use shades and tints in the larger areas. Use warm and cool colours together for contrast. When colours such as red appear closer to the observer than do cool colours such as blue. In general, foregrounds should be warmer than backgrounds.

### Arranging the Bulletin Board

1 Utilize various media of visual appeal involving attention-getting devices.

2 Mount the pictures and articles in pleasing coloured backgrounds in harmony with the rest.

3 General informational pictures are best mounted uniformly and arranged together.

4 Highlight different areas by labels and titles.

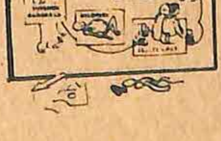
5 Questions and short statements arrest attention if placed near pertinent objects or pictures.

6 To create a dynamic effect, use coloured strings of ribbons leading from the statement to the book or pictures placed on projecting devices artistically situated.

7 Use paper arrows in constrasting colours to differentiate different areas.

8 For an over-all artistic appeal, use flower arrangements and abstracts designs, if possible.

9 Simplicity and brevity are keys to good arrangement. In addition to these, timeliness, variety, continuity, order, colour, and a nice regard for spacing and balance are important.



## 15

# Models

OF ALL the A. V. materials, models and mockups are nearest to living experiences. Models and mock-ups are replicas or reconstructions of the real thing. They are contrived experiences where reality is altered or simplified for teaching purposes.

### Three-Dimensional Teaching Materials

*Models :* Recognizable three-dimensional representation of real things.

*Objects :* Real things which have been removed as units from their natural setting.

*Specimens :* Objects which are incomplete or which are representative of a group or class of similar objects.

*Mock-ups :* Devices which are imitations of real things without involving similarity of appearance, the non-functioning parts that are unnecessary for understanding operational functions being omitted.

*Dioramas :* Three-dimensional scenes incorporating miniature objects and backgrounds in perspective.

*Puppets :* Human figures with jointed limbs moved by mean of strings or wires or figurines designed to dramatize a situation or action.

*Mobiles :* A mobile is a system of correlated teaching materials painted and cut out from cardboard or consisting of solid models or both, hanging from a single source and balanced with the help of strings attached to a conical pattern of wires.

*Study kits :* A study kit is a box containing a variety of visual aids, artistically assembled and displayed pertaining to a single topic.

*Jump up Picture Books :* Pictorial story books or flip books with pages having outline of certain scenes in the story cut out in a manner that makes the elements therein jump up when opened, in order to create a three-dimensional effect.

### Instructional Purposes of Models

1 Models have manageable dimensions.
2 Models capture the past and the future.
3 Models take us to places that are physically inaccessible.
4 Models simplify reality.
5 Models demonstrate processes.
6 Making of models is a useful curricular activity.

### Principles of Using Models

1 Arrange display of specimens to stimulate interest and arouse curiosity.
2 Secure models when real objects cannot be brought into the classroom.
3 Use mock-ups or synthetic devices to show functioning of complete units.
4 Explain that any model, or mock-up is incomplete or out of its natural setting.
5 Encourage collection of specimens making of models and mock-ups.
6 Avoid too large, unorganized, or overelaborate displays of specimens.
7 Avoid using models or mock-ups too complicated for the maturity of the group.

# Relief Maps and Relief Models

## 16

A RELIEF model is a recognizable three dimensional representation of a country or a part thereof. The vertical development on a flat surface in semi-natural colours brings out orographical features clearly. A relief model of India is of basic importance in the teaching of social studies in elementary and secondary schools.

### Materials Required

(i) Some pieces of plywood.
(ii) A school atlas.
(iii) Some papier-mache, china clay, plaster of paris and soluble glue.
(iv) Some basic water colours, brushes, Indian ink and varnish.

### Preparing the Base Board

Select a map of India indicating the physical features. This will depend upon the desired size of the model. A map of India from a school Atlas can be easily traced on a sheet of paper 8″ by 9″. The size of the base board of the model will be proportionate to it, *i. e.*, 16″ by 18″, 24″ by 27″, 32″ by 36″, etc. A convenient size for classroom demonstration is 24″ by 27″. So select a plywood piece of this size with a thickness at least 3/8″. The outlines of the map of India are to be enlarged on to the base board by a system of proportionate squares. Each side of the square is to be three times as big as the one drawn on the map.

The colour scale on the map shows different level of elevation. Since we are making a small relief model, we need to determine the major physiographic levels. From the colour scheme on the map, we find that the contour lines coinciding with such convenient divisions the ones for areas upto 6,000′, 12000′ and 18000′. Enlarge these contour lines on the base board.

### Mounting the Cut-outs

Trace the lowest contour line from the base board on a tracing paper and transfer it to another piece of plywood. Cut out a piece along this line with the help of a fretwork saw. Repeat the same process in the case of other two chosen higher contour lines.

Mount the piece coinciding with the lowest contour line with the help of nails on the base board. Fix the other two pieces, one upon the other, on the board.

## 17

# Maps and Globes

A MAP is a representation, on a plane with a reduced scale, of a part or the whole of the earth's suface. A collection of maps is called an Atlas, after the figure of Atlas, the 'Titan', supporting the heavens.

A globe is a three-dimensional representation of the surface of the earth on a very small scale. It is impossible to represent on a plane the whole of the earth's surface, or even a large extent of it, without a considerable amount of distortion. A globe does it faithfully.

### Purposes of Maps and Globes

To depict geographic features of the earth's surface.

To show relationship between places.

To furnish information concerning distances, directions, shapes, sizes, areas.

To clarify descriptive materials.

To provide interest and stimulate further study of peoples and places.

To serve as a basic and multi-purpose visual aid in the teaching of social studies.

To create a basis for a vicarious experience while studying about peoples and places.

### Use of Maps

Maps are universal visual aids. They lend attractive pictorial symbols and adorn the pages of books, magazines, and news-papers, etc. Maps serve many valuable purposes in developing the concept of many a social phenomena. What cannot be mapped cannot be described. Maps and globes are the basic tools in the teaching of social studies. A map helps to reduce the scale of areas and, distances and thus brings the abstract concepts of size, distance, and direction into the region of reality. Before the understanding the physical and social environments, their mutual interactions and relationships, a student must know how to read maps and make his own maps.

### Suggestions for the Selection and Use of Maps

1 Wall maps are primarily for class use and should have important details clear from a distance of 25 feet. They are to be judged in relation to their use.

2 General purpose maps must not be burdened with details that might be better shown on special purpose maps.

3 No flat map can give an accurate representation. The teacher must know the different projections.

4 The physico-political maps have a clear advantage over the political maps in clarifying many relationships.

5 Maps should be graded and used according to the maturity of the students.

6 Use many varieties of maps.

7 Maps to be used should be such on which all lines, such as coasts, rivers, and boundaries are shown plainly.

8 The index or reference or legend must be legible. Names should not be printed on other symbols.

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### Basic Essentials of Maps

| | |
|---|---|
| *Visibility :* | The students should be able to read it without strain in relation to their distance from the map. |
| *Detail :* | It should have just the relevant details. |
| *Scale :* | It should be properly represented both by a graph and a statement. |
| *Symbols and Colour :* | Symbols should not be crowded and the colour should be a genuine aid. |
| *Accuracy and durability :* | It should be accurate, well-printed and well-mounted. |

### Globe—A Universal Teaching Tool

A globe is the most basic equipment of a geography room. It is essentially needed in the teaching of many topics in physical, mathematical and economic geography. In the teaching of social studies it has far-reaching and universal applications.

### Some Specific Purposes and Uses of Globes

1 To correct misconceptions about the shape of the earth.

2 To provide a realistic basis for the study and interpretation of maps in the teaching of geography in particular, and social studies in general

3 To demonstrate the phenomena of day and night and change of seasons.

4 To build concepts regarding lines of latitude and longitude.

5 To demonstrate various other concept in the teaching of geography, relation between time and longitude, date line, planetary winds, currents, means of communication and transport, etc.

6 To develop a spirit of internationalism and a feeling of neighbourliness in this rapidly contracting world of ours.

7 To illustrate the topics regarding man's exploration and discovery on the earth.

8 To serve as a basis for the discussion about current events, etc. etc.

### Types of Globes

1 Globes are of various sizes. The size : is usually expressed in terms of the length of its diameter. Common sizes are 8, 12, 16, 20, and 24 inches. The 12″ and 16″ globes are most frequently used.

2 There are various other special globes air-age, celestial relief and climatology globes.

3 There are three principal types of globes which are commonly used in schools : political, physical-poltical and slated outline globes.

4 Fancy and decorative globes : Plastic globes, transparent globes with bulb inside, papier-mache and hand-made globes, etc.

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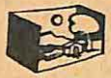

## 18

# Dioramas

A DIORAMA is a miniature three-dimensional exhibit using small objects, modelled figures and backgrounds in perspective, against an appropriate setting. The objects need not be done to scale, the difference in sizes is exaggerated from front to back in order to create an illusion of depth and distance. Sometimes, artificial lighting at the back or some significant points enhances the vividness and realism of the dioramic display.

### Uses of Dioramas

Dioramas are an essential visual aid where learning situations involve the third dimension. They make experience more concrete, tangible and memorable. The situation depicted through a diorama becomes more real with the basic elements of depth and substance and thus it leads to the development of a nearly complete sensory experience.

Dioramas depict distant places, historical periods, scenes from a story, or an imaginary situation, etc. In public exhibition, dioramic displays are effectively used to show industrial, natural and man-made developments, mock-ups of machines, stages of a process, etc. Thus dioramas can be improvised to serve as teaching aids for many concepts in social studies, general science, languages, and other specific areas of a school curriculum.

Dioramas can be easily developed as a purposeful activity in the class with the co-operation of a group of pupils, from easily available materials. Cardboard dioramas do the job quite effectively. You require only sheets of cardboard, poster colours, brushes, a small stapling tool, etc. for these.

### Design for a Simple Diorama

A diorama that folds up vertically can be easily developed with the help of cardboard pieces. Decide upon the theme or situation that you want to depict through a diorama. Identify an illustration or develop a sketch for this purpose. You are required to add the elements of the third dimension to this through the form of a diorama.

As you view the basic illustration or sketch proposed to be developed in the form of a diorama from a distance and imagine a depth in it, you develop a 'depth of focus' like viewing through the lens of a photographic camera. Differentiate, three or four, basic parallel and vertical blocks of this illustration. Identify its different parts that coincide with these blocks. Generally, three such blocks or layers are enough. Try to split up this illustration into three layers by marking out the demarcating outline. Thus you find a foreground, middle-ground and background respectively.

Prepare three cut-outs corresponding to the three different layers which indicate the three different blocks. This can be done with a piece of cardboard or thick card paper. Split the illustration on to these and colour these cut-outs. Fold these along a central vertical line. Hold all these vertically on a table adjusting the positions and the angles for holding. The three vertical edges of the cut-outs must converge in a straight line, so cut out the extra protruding parts. When you fold these, you get a folder-like shape. Staple the edges with a simple stapling tool. Thus you get a vertical folding diorama from any illustration.

## 19

## Puppets

PUPPETS are a powerful medium of mass communication. They provide a dynamic source of education for children and create a sense of realism in communication. They also serve as a multi-purpose medium of self-expression. The puppets have great utility in the field of entertainment, education, self-expression, and social action.

### Major Types of Puppets

*The Glove or Hand Puppets.* A glove puppet is worn on hand. The first finger is inserted into the head of the puppet, while the middle finger and the thumb fit into the hands.

*The Marionette or String Puppets.* These are suspended by strings controlled by the puppeteen's hands. A string puppet has jointed body and limbs of wood strings, stuffed cloth or strings.

*The Rod Puppets.* A rod puppet has a head or the head with the dress of the lower part of the body fixed on a rod which can be easily manipulated by a hand.

*The Shadow Puppets.* Shadow puppets consist of flat figures in the form of silhouettes attached to small sticks. These are manipulated in front of a source of light and consequently the shades thereof fall on a small cloth screen placed in front of the audience.

### Making Simple Glove Puppets

1 Take a piece of thin cardboard or card paper, approximately 5″ by 6″. Wrap it loosely around your forefinger. Glue the edge firmly and wrap a string around this tube.

2 Take a piece of crumpled newspaper and fix it over and around this tube on your finger. Cover this with a sheet of plain paper or with a piece of light cloth.

3 Prepare a fine paste of papier-mache mixed with some glue and china clay.

4 Take a wooden stand and fix the base of the head of the puppet on this. Apply a fine coating of the papier-mache paste all over the base. With the help of your thumb or any other pointed instrument carve out the cavities for the eyes, ears, nose, mouth, etc.

5 Next step is to colour the puppet head. Apply a coating of bits of tissue paper or kite paper with glue or paste. After this has dried, give a coating of thin solution of shellac or glue. This provides a suitable base for colouring. Now apply the colours that conform to the natural colours of the character that is to be made out of the puppet head and indicate the facial features boldly.

6 Then make a simple dress for the puppet head which can be worn over a hand

that is to mainpulate the puppet. Hands for the puppet can be made with papier-mache. You can even use small children's gloves or these can be made out of cloth.

### Some Variations in the Technique of Making a Head

i) Take two pieces of wire and hold them together. When they are held at right angles to one another, we get a base with a projection for the nose to be developed into a head after filling with crumpled newspaper.

ii) To make a hollow head, you can fill a piece of cloth or newspaper with saw-dust, wood shaving of cotton upto a size that you want. This material is to be tied to the basic tube.

iii) You can develop the front part of the head from a clay base. Make a clay model of the front part of the head. Cover it with glued pieces of paper. Put many coatings of paper. Afte the paper coatings have dried, remove it from the model. Now with this you can develop a head.

iv) In order to make the puppet head lighter still, the protruding facial features like nose and mouth can be made on separate clay moulds to be fixed on to the round head developed in a simple way. By spreading a piece of cloth dipped in glue, the wrinkles on the forehead can be easily simulated.

v) If you have filled the puppet with saw-dust or some other material which was put in the newspaper, you can force it out with a screw driver.

vi) You can also cover the round base for the head with a piece of fine cloth or preferably with a piece of nylon cloth. The facial features can then simply be painted.

## 20

## Projected Aids

A VAST variety of instructional materials is now being produced and utilized in the form of projected aids. They constitute a wide range of teaching aids from the projected illustrations to the television images. They compress ideas and information that are presented graphically and forcefully through successive frames. Projected aids minimize the chances of distraction in a dark room and focus group attention on an illuminated screen. They increase learning and retention and stimulate greater pupil interest in the subject matter.

### Types of Projected Aids

*Filmstrips and Photographic Slides.* Silent and sound filmstrips, 2″×2″ and 3½″×4″ slides, stereo reels, micro films.

*Motion Picture Films.* 16mm and 35mm films, educational television.

*Other types of still Projected Aids.* Flat picture book illustrations, graphic strips or illustration rolls, etc., projected through an opaque projector overhead transparences projected through an overhead projector, projections on the shadow play screen.

**Purposes of Filmstrips**

A filmstrip is a coherent sequence of still pictures and titles on a strip of 35mm film. It generally has 20 to 30 frames of pictures, drawings or illustrations, and, in size, it can be single or double frame. The purposes of the filmstrips are :

To elucidate specific topics for clear understanding.

To present still pictures in a logical sequence.

To develop a group viewing situation and thus to stimulate discussions.

To enrich the background knowledge and to reinforce learning.

## 21

# Educational Films

AN EDUCATIONAL film is one which contributes to the achievement of desirable educational goals by making effective use of the motion picture as a medium of communication.

**Inherent Characteristics of Films**

1 Understandably visualize the subject.
2 Portray things and processes by employing motion.
3 Create an illusion of the original environment.
4 Develop adequate narration to direct the learner's attention.
5 Are based upon the content of the school curriculum.
6 Are an audio-visual synthesis of environmental and interpretative sounds and visual concepts.

**Classification of Films**

1 Basic Teaching Films.
2 Supplementry Teaching Films :
    (a) documentary films
    (b) sponsored films, and
    (c) entertainment films.

**Use of Instructional Films**

1 Films through the medium of motion compel attention and thus make meaning clear.
2 Films provide the elements for vicarious visual experiences and thus heighten realities.
3 Films can control the time factor in any operation or series of events.
4 Films can bring distant past and the present into the class room.
5 The lessons involving films create interest more quickly and sustain it better than the traditional lesson that is so top heavy with verbal instruction.
6 The films can enlarge or reduce for actual size of objects and thus motivate learning.
7 Motion pictures reproduce hidden processes and thus make learning more real.
8 The use of effective and appropriate films results in more learning in less time and better retention of what is learnt.
9 The films provide a common denomina-

tor of experiences and thus develop class discussion.

**Effective Use of Instructional Films**

Various possibilities of using a film are listed below :

1 Before actually starting a topic, show the film with proper preparatory questions and cautious hints that provide a proper mental framework for viewing. Then refer to the film literally as the topic develops in the class.

2 Just use the film without a proper prelude or explanation and let the students find for themselves the various aspects and points related to the topic. Develop a class discussion after the film and decide salient points of emphasis. Then show the film again and expand the topic by actual teaching.

3 After initiating the topic, revealing some of its preliminary details, the film can be used at a crucial point of developmental difficulty. Thus the film will review the topic again and prepare and lead the students towards detailed aspects thereof.

4 If the film is shown as a recapitulatory activity, no previous discussion is needed. Let the students discuss at the end some difference of treatment of the topic that arise from class teaching and film viewing.

**Some Precautions in the Use of Films**

1 Do not use classroom films for mere entertainment.

2 Do not use films when motion in not portrayed.

3 Do not use films that are too long to permit preliminary preparation of the class and subsequent follow-up work.

## 22

# Audio Materials

AUDIO MATERIALS are the sources of audio learning experiences. These are radio and recordings of radio broadcasts, disc records and tape-recordings of educational programmes. The television and the film, which are audio-visual materials, too have an effective audio part.

**Value of Audio Materials**

Audio materials constitute useful and far-reaching enrichment aids for learning. Audio experiences facilitate concentration, motivate abstract thinking and imagination for comprehending a theme. They supplement other teaching materials.

Educational radio broadcasts bring current events, happenings and important personalities within the reception area. They develop a feeling of participation on the part of the listeners with regard to the actual situation of the content of the broadcast. By providing aural presentations of dramatic materials, they stimulate imagination.

Recorded audio experiences capture original sound for a later use to develop audio imagery for learning. Apart from having all the advantages of radio broadcasts, recordings have certain added features that make them unique and valuable audio meterials. They preserve permanently all sounds of aural presentations that were once presented as live programmes. These records can be controlled by the teacher as these can be edited, interrupted or used in any way he likes.

**Specific Use of Audio Materials**

Select worth-while radio programmes and recordings that can enrich learning unit.

Use radio broadcasts only when they contribute to the learning process.

Tape record the radio broadcasts that occur during out of school hours and that can be re-used. Encourage students to listen to these at home and prepere reports on these.

Tape recorder is a flexible instrument in the hands of an imaginative teacher. It can be used in language, arts, music and for practice in public speaking, etc. Encourage the students to record relevent narration to supplement and accompany filmstrips, opaque projection materials, films, etc.

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## 23

# Displays and Exhibits

AN EDUCATIONAL exhibit is a planned arrangement of graphic materials, specimens, dioramas, etc., correlated around a basic theme.

**Purposes of Exhibits**

To focus attention of the observer on a topic of educational significance.

To rebuild scattered ideas and undigested bits of information around a nucleus for proper integration.

To give experiences in collecting, making and exhibiting materials.

To encourage self-expression and build understandings in a concise manner.

To provide a concrete background to conceptualize abstract ideas.

To present matter in visualized form.

To serve as a multi-purpose source of education.

**Basic Essentials of Display**

(*a*) *Modern Style of Display.* A modern creation in art and display represents and develops the contemporary aesthetic and cultural values.

Elements of Modern Style are :

Accentuation of the essential.

Suppression of details distracting from the meaning of the subject.

Bold conception of form and space.

Monumentality through simplicity.

Clear, clean lines.

Rhythm.

Usefulness.

(*b*) *Balance and Symmetry in Display.* Create a dominant object by virtue of its proportions and shape. Make the rest of the composition complementary to it.

Balance areas and colours against one another.

Avoid monotony by not repeating colours or forms or proportions.

(*c*) *Role of Lines and Forms in Display.* Displays and exhibits are composed of certain geometrical elements. These are lines, planes and solid bodies which are an integral part of the layout. Some governing rules for using lines and forms are :

Do not overcrowd the space with geometrical symbols.

Vertical lines produce force. They signify strength power and volume.

Horizontal lines unify the diversified elements in a composition.

Diagonal lines stand for action and movement.

Converging and diverging lines create an illusion of depth.

Curves represent softness and shape lines. Do not introduce too many lines and forms.

(*d*) *Contrast in Display.* Create a contrast between the light and dark parts. Lack of contrast will diminish the value of displays. The elements with which we can create a contrast are proportions, forms, heights, angles, groupings and colours.

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## School Museum

MUSEUM is dervied from the Greek word *mouseion* meaning temple of muses. It is place of study which specializes in assembling, protecting and showing of objects, specimens and exhibits of a great variety.

The museums are of various types, like general museums, museums of art, history, natural history, applied science, childrens' museums and trailside museums. Dr. Goode distinguishes the following types .

National museums, local museums, provincial or city museums, college or school museums, professional or class museums or cabinets for special research.

### School Museums

School museums serve as a vital source of instructional materials readily available for integration into the curriculum. These can be developed through the imagination and initiative of the teacher and the active participation of the motivated pupils. Different subject rooms can have independent museums cabinets or corners like the geography museum, art museum, etc. School museum should have some show-cases of general interest which can be kept in corridor, assembly hall or the library.

### Materials for the School Museum

1 Ready-made study-kits and correlated visual aids to build a display on different topics.

2 Objects and specimens collected through the resources of the students or commercially procured.

3 Discarded materials from city exhibitions available on request.

4 Study-kits and cheap visual materials available from industries.

5 Anatomical pieces, stuffed animals, aquaria, specimens of eatables, costumes of different periods, curios and souvenirs, dolls and toys, preserved flowers, stamps and coins, ancient relics, art and pictorial materials; raw materials like minerals, food and industrial commodities, etc.

**Purposes of Museums**

1 To concentrate attention and stir up interest in visual media, related to the topic of study.

2 To integrate scattered ideas to evolve a new concept.

3 To relate the abstract idea to concrete material and thus build clear-cut understanding.

4 To provide pupil experiences in collecting and exhibiting materials.

5 To exhibit materials which may be foreign to the direct experience of pupils.

6 To encourage self-expression and develop skill in observation.

7 To promote sharing of experiences by group visits and discussions.

8 To provide exercises in group projects and correlated activities covering various areas of the curriculum.

## Study Kits

## 25

A STUDY KIT is a general teaching-learning device, consisting of a correlated assemblage of audio-visual aids, such as, graphic aids, small models and specimens, filmstrips, folders, pamphlets and allied literature, etc., pertaining to a particular subject or theme. These audio-visual materials or instructional aids are carefully selected to depict various aspects of the main subject or theme or they elaborate a topic in detail. The materials are artistically placed in a box.

**Display Aspect of a Kit**

At times, a part of relevant material is fixed in the form of built-in displays in the box so that when the box is opened for study, a panoramic view of some aspects of the kit engages the viewer and motivates him to unravel and explore other items. In some study kits the elements of display are absent in order to make the kit light. The materials are packed in separate containers to be taken out, displayed and studied as desired.

**Wide Range and Variety of Kits**

The idea of study kits has emerged from the progressive museums of the world. They keep these kits in the form of a mobile exhibition for wider use, thus putting dioramas and display panels around a theme, usually fixed in the museums, into circulation. Some museums build packages of thes materials to be loaned to educational institutions on request.

Ray Industrial Museum, Poona has developed small kits in small wooden boxes on topics like, lac, groundnuts, etc. These are specially assembled on the pattern of a basic proto-type or model kits developed by the museum. The National Museum, New Delhi have developed a kit on the Ancient River Valley Civilizations of India. The National Institute of Audio Visual Education, New Delhi have developed a study kit, entitled 'Our India', and many other study packages.

Now, the kits cover a wide range of forms and contents as far as the assemblage and display of the contents is concerned. They range from a simple cardboard box containing the A. V. materials to a mobile exhibition kit.

**Educational Value of Kits**

The kits on general topics provide the basic reading and other audio-visual materials for preparing a solid and fertile background of information to be developed progressively. They involve the learner and motivate him to delve deeper into a subject by other related references. Such kits cover an extensive field of study.

The kits on specific topics, assembled carefully, from selected and prepared materials, form a sound and intensive analysis of the topic.

Study kits are a dynamic medium of self-education.

Study kits provide a wide variety of teaching tools and curricular materials to the teacher for improving his teaching and developing better techniques of communication.

Study kits kept in a school museum or library create focal points of interest for lay students.

Assembling of small kits on a wide variety of topics, as a pupil-teacher activity will create a better intellectual atmosphere in a school and will enrich the study of many a curricular topics.

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## Field Trips

FIELD TRIPS put the school on wheels. They take the students for an on the spot study of the environments, by bringing them face-to-face with reality. Properly organized field trips leave basic impressions on the minds of the children and on these the future learning experiences grow. Field trips, study tours and excursions are very effective for teaching social studies and general science. Students get first-hand experiences of handling things, seeing functions, spots and situations which they study in their texbooks.

**Purposes of Field Trips**

To utilize the resources of the environments to their fullest extent for teaching purposes.

To show events, situations, objects and specimens in their natural settings.

To broaden understanding and experience through direct purposeful observation.

To provide experience in supervised observation.

To add interest, variety and involvement to the learning situations

To reduce the boredom of teaching.

**Organizing Field Trips—Some Hints**

1 *Relate the field trip to the curriculum :* The need for a field trip must emerge from the learning experiences of the students. It should reinforce some points in their natural setting or it should precede some discussions and details about class topics. It should be integrated into regular teaching. Thus work out proper schedule for the field trip in advance. Define the specific purposes.

2 *Prepare the Students.* Keeping in view the basic purposes, prepare details about the places to be visited. Prepare the students by giving them basic information about these places. Highlight the main points and give the students a list of things to look for. Prepare them as carefully as you would for any other learning situation.

3 *Pupil Teacher Planning.* The organization of field trips should emerge out of a group discussion. Suggestions of the students should be incorporated. Different groups of students should be assigned different reponsibilities and jobs in connection with the field trip, such as, organizing the transport, looking after refreshment, taking notes, making sketches of certain situations, etc.

4 *Incorporate Follow-up Activities.* After the field trip is over, let the students relive their experiences. Let them give certain conclusions based upon their observations. Some group of students should be asked to prepare reports on various aspects of the trip. Try to correlate the purposes of one field trip around many subjects and topics. A multi-purpose field trip will involve many subject teachers and will thus develop a purposeful corporate activity.

# Audio-Visual Aids for Science Education

## 27

THE CONCEPT of science education outlines fundamental understanding of facts, principles and concepts of science and the growth in the use of scientific methods and attitudes.

Audio-visual aids provide some of the basic tools of learning in science. By providing a variety of means and by analyzing the subject matter graphically, they facilitate the formation of concepts in science. They help us to preceive our physical environments in a realistic manner. They provide a physical basis, a purposeful orientation and a learning setting for understanding the logical analysis of contents. Observation and experimentation are direct purposeful activities. These are the basic tools of a learner and they constitute the bed-rock of audio-visual experiences.

Graphic aids like charts and posters bulletin boards, models and three-dimensional materials, films and filmstrips, other aids and activities like experimentation and demonstration are some of the basic and simple audio-visual aids for science education. Nowhere is the pupil-teacher preparation of audio-visual aids so important as in the teaching of technical subjects. By common planning and education in the form of well defined projects, the students develop the topic progressively, interest is enlivened and a spirit of discovery is animated.

The main types of graphic materials for science are : charts, posters, diagrams, graphs, maps, cartoons, comics, illustrations, etc. Main characteristics of graphics are : vivid clarity, forceful description, effective presentation, and emotional impact.

Bulletin boards display the graphic and pictoral materials possibly linked up with the teaching topics, attractively and invitingly.

Of all the audio-visual materials, models and mock-ups are nearest to learning experiences in science. Models and mock-ups are replicas or reconstructions of the real thing. They are contrived experiences where reality is altered or simplified for teaching sciences.

The role of films in science is to develop an acquaintance with the material world and to nourish the scientific habit of mind. Good science films depict the basic elements of scientific exploration. They depict the methods or processes that cannot be directly demonstrated with special pictorial demonstrations involving complexity of intermediate steps. They depict the action observable vicariously by bringing the world into the classroom. They simplify the observable action. They depict the unobservable action through animation. They simulate reality through recorded sounds. There is a unique technical versatility of this medium by making use of photographic tricks.

## Other Teaching Aids and Activities

*Demonstration.* Demonstrations clearly outline how something is done. They add reality to an experiment that will otherwise be only imaginary.

*Science Study Kits.* Students should be encouraged to collect relevant materials connected with a topic in science and technology. These should be properly analyzed and presented in the form of a kit which will serve as a general source of motivation for all.

*Science Museums and Exhibits.* Finally a good deal of exhibitable materials for teaching science can be evolved. These can be correlated into certain basic themes and built into an exhibition. A museum cabinet or a bigger class museum of science can be developed.

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# Audio-Visual Aids for Mathematics

TEACHING aids or audio-visual materials are not new in the development of mathematical thought. Most of the elementary and basic concepts, on which the superstructure of modern mathematical theories rest, were evolved by man out of direct personal experiences. If we analyze a mathematical problem, its comprehension and ultimate solution hinges around a correct perception of the element of the situation involved. The audio-visual aids present multi-sensory experiences and stimulate our perception more clearly and quickly. By putting something concrete into the hands of a child, or presenting in the form of a visual aid, something that will enable him to enter actively into the learning situation, and simultaneously auditory, visual, aural, tactual, and muscular sensations unite in a drive, we find a better picture of the conceptualization of the problem.

Now here are the maxims 'proceed from the concrete to the abstract' and 'from the known to the unknown' so true as in the teaching of mathematics in general and of arithmetic in particular. The child's experience of number and the fundamental operations connected with them has to be developed through the senses of sight and hearing.

The traditional approach to teaching arithmetic, whereby abstract concepts are usually presented to the pupils in an authoritative manner, should be discouraged. The availability of audio-visual materials stresses the prior presentation of concrete experience first. If abstraction is to be meaningful it should be based upon first-hand experience. Develop a numerical abstraction with the help of a series of experiences with things. Then reverse the deductive process to make practical applications to real-life situations.

Teaching materials or audio-visual aids tend to simulate reality in the classroom. They aid in making the abstractions involved more tangible and concrete. For example, the objects and games in the teaching of arithmetic and geometry represent life-like manifestations of quantitative and numerical relationships. It is important that the mathematical concepts grow out of direct personal experiences.

**Various Categories of A.V. Aids**

1 *The Auto-didacted apparatus of Montessori Schools.* This is a set of scientifically graded wooden blocks, beads, models, etc., whereby the comprehension of the child in the realm of mathematical concepts is gradually developed. This can be seen in most of the schools oriented to the montessorian techniques.

2 *Puzzles, Performance tests and Indoor games.* A vast variety of such items is available now-a-days in the shops dealing with toys and indoor games. Most of these can be profitably harnessed in the classroom to teach arithmetic.

3 *Group Projects and Play-way Techniques.* The teachers can, with their ingenuity, devise many such techniques and activities to teach mathematics.

4 *Display Boards—especially flannel board.*

5 *The Geo-board and a System of Blocks of various sizes and various colours.* The

geo-board can be of a plywood piece, 18″ by 8″, with 2 inch squares marked on it. Nails of uniform sizes can be put on all corners of the squares. Use circular rubber bands of various colours to be stretched in various patterns on the board by stretching them around the nails. We can show 2″, 4″, 16″ etc., squares. By putting them around three nails we can develop triangles and so on ; most of the geometric figures like polygons etc., can be made. This is helpful in teaching a variety of propositions in demonstrative geometry, arithmetical concepts, etc.

The system of blocks can provide a physical and solid basis for teaching fundamental operations in arithmetic and algebra.

6 *The Family of Abaci.* The abacus is an international and universally known aid. These days, a wide variety of these aids are available and they are being used popularly.

7 *The Mathematical Instruments.*

- (i) For measurement
    - (a) Laboratory instruments.
    - (b) Applied instruments.
- (ii) For calculation
    - (a) Graphic instruments.
    - (b) Slide rules.
    - (c) Business machines.

8 *Films.* Films in mathematics are very useful. Their purposes are :

To create readiness for new concepts.

To introduce new concepts.

To provide understanding of social situations and their quantitative aspects.

To develop computational skills and mathematical understanding.

To create sensitiveness to a number of social situations.

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# Audio-Visual Aids for History

THE UTILITY of A.V. aids in the teaching of history may be summed up as under:

History must come to life in the classroom. Audio-visual aids supply a concrete basis for thinking and learning in history. Thus they reduce the meaningless verbalism.

Use of instructional materials makes the dull subject of history more realistic.

Temporal orientation of the learner is basic in the teaching of history. A. V. aids take us even to the remotest periods of history, whereby the past comes to life. They bridge the gaps in different periods and develop a continuity of thought.

The teaching of history is to be connected with direct purposeful experiences. A. V. aids provide experiences not easily obtained through other materials and provide a depth and variety of learning for associating with related facts of history.

A. V. aids develop a high degree of interest for the students and stimulate self-activity on their part.

Hence by reducing verbalism, adding interest and involvment, stimulating self-activity and developing continuity of thought, they make the learning in history permanent.

**Specific Aids for Teaching of History**

(*a*) *Graphic Aids.*
  1 Photographs and pictures.
  2 Charts and maps.
  3 Diagrams and plans.
  4 Cartoons and comics.

(*b*) *Display Boards.*
  1 Black boards.
  2 Flannel boards.
  3 Bulletin boards.
  4 Multipurpose boards.

(*c*) *Three Dimensional Aids.*
  1 Models.
  2 Diagrams.
  3 Objects and specimens.
  4 Puppets.
  5 Mobiles.

(*d*) *Projected Aids.*
  1 Films.
  2 Filmstrips.
  3 Slides.

(*e*) *Activity Aids.*
  1 Field trips.
  2 Dramatics.

(*f*) *Miscellaneous Aids.*
  1 Study kits.
  2 Recordings and Radio.

# Audio-Visual Aids for Social Studies

## 30

THE BASIC function of a course in social studies, in the elementary and secondary classes, is the development of certain basic understandings, essential skills and desirable attitudes for improved social living, in every child that studies this subject. An individual's behaviour is in a large measure determined by his attitudes, constituting a stage of mental and emotional readiness to react to situations. Audio-visual instruction contributes vitally towards the development of attitudes, since it provides non-verbal experiences and vicarious learning experiences nearer to reality. By adding interest and involvement, visual aids reduce verbalism and make the textbook centred subject like social studies, lively and interesting. By providing a variety of techniques, these aids bring the world into the class room and thus make learning permanent. They emphasize rich learning experience through purposeful activities as against meaningless and repetitive verbalism.

Education is an active process of socialization, hence learning no longer remains as an individualized and centralized mental process. A major objective of teaching social studies is to provide the young learners with numerous opportunities for group work as a part of their learning process. Hence we advocate the use of self-made visual aids developed as a result of pupil-teacher participation. As the basic learning units in social studies are progressively evolved, realted visual aids can be developed as class projects.

### Visual Aids for Social Studies

1 *Charts and Graphic Aids.*

Self-made charts and other graphic aids like maps, diagrams, flash cards and flannel graphs serve as basic and universal aids in the domain of social studies.

Charts should be developed, designed and prepared as a result of pupil-teacher planning. They are often more useful than the ready-made ones as they are geared to the needs and requirements of the units of teaching. The teachers should tap all available resources like pictorial magazines, encyclopaedias and other illustrated materials.

2 *Models, Dioramas and Other Three-Dimensional Materials.*

Models and other three-dimensional materials present an edited version of reality in social studies. They help the teacher to present certain physical and social phenomena in the form that has the attention getting addition of the third dimension.

Relief models help us to study all problems of man in his environments. Relief models of a part of the earth or of any other physical phenomena or topographical features can be easily prepared with the help of papier-mache and other materials.

By combining a series of relief models on some physical, economic, social or cultural topics, three-dimensional atlases can be developed.

3 *Maps and Atlases.*

Maps serve as a dominant and basic teaching material for social studies. Large wall maps and atlases can be easily prepared on large sheets of card paper to get a bigger surface. The details can be enlarged and filled in different colours by referring to some standard maps and atlases.

4 *Preparation of Globes from Pitchers.*

Cheap and inexpensive, yet fairly useful and attractive globes can be prepared with the help of pitchers, papier-mache plaster of paris and other usual art materials.

5 *Bulletin Boards and Display Boards.*

Bulletin Boards serve as windows on the world in a social studies room. They provide the cheapest and multi-purpose nucleus for visual education.

The display material can be arranged on the bulletin boards or display boards and can be fixed in the room and these materials can be correlated to the topic in hand.

6 *Developing Museum of Social Studies.*

A museum of social studies will serve as a vital source of instructional material readily available for integration into the syllabus of social studies.

This can be developed through the imagination and initiative of the teacher and the active participation of the motivated pupils. Social studies require a wide collection of objects, models and graphic materials which can be progressively developed through pupil-teacher participation. Out of such materials a museum of social studies can be and should be evolved by the students and teachers. This will enrich their experience and excite new interest in social studies. They will be motivated to use new reference materials in search for answers to their question about the museum exhibits.

7 *Preparation of Study Kits.*

Study kits comprise a collection of audio-visual materials that can be easily seen, read or handled. These materials are assembled and correlated around one theme or topic. Study kits for developing learning experiences in social studies provide readily accessible avenues of direct purposeful activities and pupil-teacher participation. By selecting some basic topics in social studies, students can be encouraged to collect pictorial and textual materials from books and magazines related to these topics. They can also build models and other displays for this purpose. All such materials can be conveniently assembled in small boxes or kits to be taken out at the time of reference.

*8 Films for Social Studies*

All motion pictures are shot against the back-drop of physical or social environments. Motion pictures are very vital and efficacious in developing social attitudes and conveying factual data. They are the most powerful medium of supplying vitalized information about man and society. By overcoming the limitations of time and space, they present the social information in a scholarly and scientific fashion. Motion pictures make the past real and present understandable.

# Audio-Visual Equipment

## 31

FOR effective and total utilization of a wide range of audio-visual experiences, we have to depend upon audio-visual equipment. They provide the major tools for the use of projected and audio aids. The basic audio-visual equipment is described in this chapter.

### 16 mm. Film Projector

A motion picture film s one of the most effective audio-visual aids. Of the three sizes in which films are produced (35mm., 16mm., 8mm.) the 16 mm. size is standard for educational purposes at present. The 16 mm. film projector is portable, easy to handle and gives satisfactory film shows for audiences upto about 600. For bigger audiences special arc projectors are required. The 16 mm. projectors are being manufactured by four or five firms in India, the price ranging between Rs. 3000 and Rs. 4000. Useful accessories, which include a screen and a projector-stand cost about Rs. 1000/-or more. The projector can be operated by teachers or librarians trained for the purpose but when the work is heavy, a separate projectionist may be employed. The main recurring cost is that of projection lamp used in the projector. A lamp lasts for 20 to 25 hours of projection. Servicing and repairs must be done by a trained person.

Educational films for use with such projectors are available from libraries such as those maintained by the National Institute of Audio-Visual Education, State Audio-Visual Departments and Embassies and High Commissions. The 16 mm versions of documentary films are also available from the various offices of the Films Division, and of feature films from the distributors. Educational institutions can also purchase their own films, An eleven minutes black and white film costs about Rs. 400.

Judiciously used, the educational film can be one of the greatest assets to the teacher.

### Filmstrip and Slide Projector

Filmstrip projectors are available from a number of firms in India. Indian models cost between Rs. 300/- and 500/- and imported ones cost Rs. 600/- and upwards. The projector can be operated by any teacher. Models which do not require electricity, but use a petromax, are also available within the same price range.

This projector can also project pictures from 2″ x 2″ slides, *i. e.*, made from 35mm. photographs. For large sizes of slides, special projectors or epidiascopes are required.

Filmstrips cost about Rs. 15/- each. They are also available on loan from libraries such as those of the National Institute of Audio Visual Education.

### Episcope or Opaque Projector

This is required when pictures from books and papers have to be projected on a screen for benefit of the class or lecture audience. Few good Indian models are available and imported makes cost between Rs. 2500/- and Rs. 3000/- in the Indian market.

Many makes also incorporate adjustments for projecting slides, including those of sizes bigger thon 2″ × 2″ and are called EPIDIASCOPES.

### Overhead Projector

The overhead projector is a comparatively new but a very useful development for classrooms and lecture theatres. The teacher, instead of writing on a blackboard, writes on a roll of cellophane paper placed on the projector and the same is enlarged and projected on a screen at his back. This means that the lecturer can teach while facing the class. Simple transparences can be made easily by hand and without having recourse to photographic methods.

Overhead projectors so far are not being manufactured in India, but it would be worth while for universities, etc., to import them for their lecture theatres. In foreign countries, such projectors are available for $250 upward.

Material once prepared for the overhead projector can be stored and utilized again for subsequent lectures.

### Microprojector

This is used for projecting pictures from microscope slides on to a screen so that objects which could only be seen by one student at a time through a microscope, can be demonstrated and explained to the whole class. Microprojectors have to be imported at present. The cost is a little above that of a good microscope.

### 8 mm. Film Projector

Technological progress has now made it possible to provide a sound track on 8mm film. These films can therefore be as effective and useful as 16mm films for audiences upto about fifty, *i. e.*, for all average classes. It is hoped that 8 mm. projectors and films will be freely available in India in the next few years.

The 8 mm. size is specially convenient for short concept films. With an average duration of 3 minutes such films cover a single concept or idea and are used by the teacher for illustrating selected points from his lecture in cases where motion picture technique can be specially useful in providing a clearer explanation or illustration.

### Screen

All types of projectors require the clear white surface of good screen on which the picture may be projected. A popular arrangement is a 178 cm. x 132 cm (70″x52″) screen with a tripod stand which can be folded into a compact portable unit when not in use. Such screens cost about Rs. 500. For classrooms a rear projection screen using tracing paper as the projection surface has been developed by the National Institute of Audio Visual Education. This gives a bright picture which can be seen without darkening the room, but this type of screen is not very portable.

### Tape Recorder

Through this versatile audio aid you can make your own recordings of talks, lectures, music recitals, etc., and play them back whenever required. Recordings may also be obtained from a library like that of the National Institute of Audio Visual Education. The tape recorder is a greater assest for teaching correct pronounciation, poetry recitation, elocution, music and dramatics.

Tape recorders are being made by a number of Indian firms and models suitable for educational institutions are available for Rs. 1,400 to Rs. 2,000.

### Record Players

With the advent of long playing records (each side having a running time of about 25 minutes), talks, features and language lessons can now be made available on gramophone records. Such records, together with different types of music recordings, can be played back on the record player, which is in effect an electrical gramophone. Indian models cost about Rs. 400 and transistorized versions capable of running on batteries are available for areas not provided with electricity. The output of tape recorders and record players can be fed to an amplifier if a larger audience is to be covered.

The National Institute of Audio Visual Education maintains a library of educational gramophone records.

### Microphone—P. A. Amplifier System

This would be an asset to any educational institution. The system comprises an amplifier with one or more loud-speakers and microphones. Programmes from a record player, tape recorder or radio can also be fed to the amplifier for a larger coverage. Different classrooms in a school or college can be fitted with loud- speakers and programmes from the amplifier can be fed to these as and when required. Alternately, the amplifier can also be used to feed loud-speakers in a hall or field

There is a wide variety and range of equipment available, with systems costing about Rs. 500 and upwards. The equipment is available from a number of companies in India.

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